



Environmental threats, vulnerability, and adaptation

CASE STUDIES FROM INDIA



The Energy and Resources Institute

Environmental threats, vulnerability, and adaptation

case studies from India



The Energy and Resources Institute

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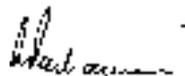
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Preface

The issue of vulnerability and adaptation acquires great importance in the context of the impacts of climate change. The Third Assessment Report (TAR) of the IPCC clearly put forward the prospect that irrespective of what happens globally in mitigation of emissions of greenhouse gases, the world will face climate change for a long time to come extending possibly over centuries. Consequently, adaptation would have to be a significant part of the strategy for dealing with climate change, requiring a clear assessment of vulnerability of different locations as well as the impacts on ecosystems and communities which are vulnerable. It is important that in analysing this issue and mapping out different options, we do not see the issue of vulnerability and adaptation in isolation of past experience. The world has dealt with naturally-induced climate change in the past, and even more so with extreme weather events that have produced harmful impacts on ecosystems and human civilization over the years. Consequently, our knowledge on how to deal with human-induced climate change and its undesirable impacts would be strengthened considerably by an assessment of how ecosystems and human communities have dealt with naturally-induced climate change phenomena in the past.

This compilation of case studies from India provides just such an analysis and in-depth study of vulnerability and adaptation based on a range of experiences in different parts of India. The universal relevance and value of this compilation is inherent in

the fact that India is a country of enormous diversity, not only in the range of ecosystems that exist and have been sustained for thousands of years in different corners of this subcontinent, but also because the country has enormous diversity of culture, social systems, and levels of economic development. Hence, the case studies produced in this volume would be of direct use to different regions of the world. It is, therefore, hoped that the material contained in these pages would be of value in enhancing the knowledge of different societies, thus enabling them to deal with the impacts of climate change wherever this challenge is faced.



R K Pachauri
Director-General, TERI

SECTION 1: ISSUES

Environmental vulnerability: the climate change and
sustainable development context

Preety Bhandari

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Poverty and vulnerability: linking environmental and
socio-economic dimensions of adaptation

Ulka Kelkar

1

Environmental vulnerability: the climate change and sustainable development context

Preety Bhandari

Environmental vulnerability is defined as the degree to which the environment is likely to be affected by natural or anthropogenic hazards. While environmental vulnerability can relate to a wide range of human-induced problems, such as pollution of water resources, industrial pollution, agricultural pollution, and unsustainable agricultural policies, natural disasters best highlight issues of vulnerability and coping capacity. Human activities that contribute to deforestation, land degradation, and climate change not only result in huge losses to the environment, but also increase the vulnerability of the environment to disasters, altering the resilience of the natural environment by reducing its ability to recover effectively from damage. The poor are the most vulnerable to both the slow and insidious environmental changes (pollution, drought, and climate change) and the sudden and acute extreme events (such as floods and cyclones).

The climate change context

Environmental vulnerability is likely to be exacerbated by climate change, with higher temperatures, changed

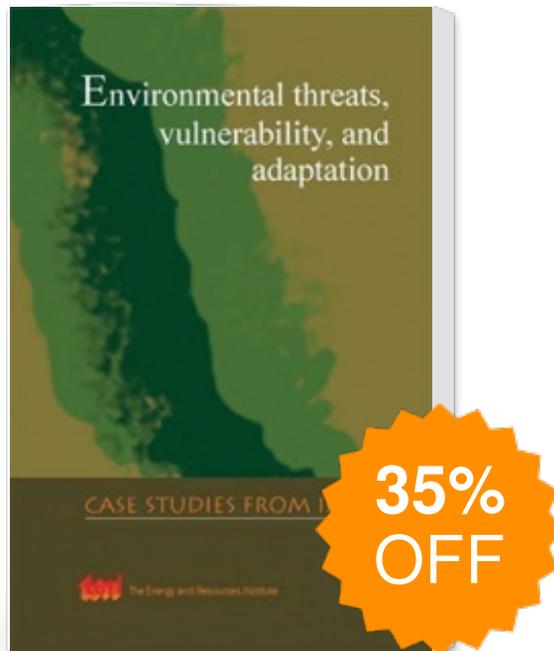
precipitation patterns, rising sea level, and greater intensity or frequency of extreme events. UNEP (2000) states that the pace of development in the Asia-Pacific region is affected due to frequent occurrence of natural disasters. Trends have shown that in the past century, this region has experienced more than 3500 disasters, which have killed over 27 million people. The TAR (Third Assessment Report) of the IPCC (Intergovernmental Panel on Climate Change) Working Group II mentions that global climate change might trigger similar changes or might result in even worse trends in the future.

The TAR points out that over the 20th century, global average surface temperatures have increased by about 0.6 °C. The decade of the 1990s was observed to be the warmest decade since instrumental records of temperature were maintained. Projections for the next 100 years do not portend well. The earth's surface temperature could increase by 1.4 °C to 5.8 °C, which will be greater than that what mankind has experienced over the last 10 000 years. This temperature rise will also be accompanied by changes in precipitation patterns and rise in the sea level (IPCC 2002a and b).

There is already evidence of changes in physical and biological systems—melting of glaciers and polar ice caps, late freezing and early break-up of ice on rivers and lakes, poleward shift of plants and animals, and changes in the habits of migratory birds, to name some.

Climate change is likely to threaten all life forms on earth, including plants and animals. The degree of sensitivity to this given change will, however, vary from one species to the other. Changes in temperature and precipitation patterns will affect several weather-sensitive sectors and areas, such as agriculture, forestry, water resources, and coasts. There is no

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